Partner Reported Opportunities (PROs)
For Reducing Methane Emissions

Install Electric Starters

Compressors/Engines ■
Dehydrators □
Pipelines □
Pneumatics/Controls □
Tanks □
Valves □
Wells □
Other □

Applicable sector(s):

■ Production ■ Processing ■ Transmission and Distribution

Partners reporting this PRO: Enron Corporation, Iroquois Gas Transmission System

Other related PROs: Convert Engine Starting to Nitrogen, Install Instrument Air Systems, Install Electric Compressors

Technology/Practice Overview

Description

In the natural gas industry, internal combustion engines for compressors, generators, and pumps are often started using small gas expansion turbine starter motors. High pressure natural gas is stored in a volume tank while a compressor is running. The pressurized gas is expanded across the starter turbine, initiating startup of the engine, and then exhausted to the atmosphere.

Partners have found that replacing the starter expansion turbine with an electric motor starter, similar to an automobile engine starter, can avoid methane emissions. The technology may include a connection to utility electrical power, site generated power or solar recharged batteries.

Methane Savings

1,350 Mcf/yr

Costs

Capital Costs (including installation)
□ < $1,000 ■ $1,000-$10,000 □ > $10,000

Operating and Maintenance Costs (Annual)
■ < $100 □ $100-$1,000 □ > $1,000

Payback (Years)

□ 0-1 ■ 1-3 □ 3-10 □ > 10

Principal Benefits

Reducing methane emissions was:

■ **A primary justification for the project** □ **An associated benefit of the project**

Operating Requirements

Electric starters require a power supply. Power can be provided from an electrical utility, portable and solar recharged batteries, or generated on-site.

Applicability

This technology is applicable in all sectors of the gas industry.

Methane Emission Reductions

Conversion to electric starters completely eliminates the venting of methane to the atmosphere and the leakage of methane through the gas shut-off valve. Partners have reported savings of 23 to 600 Mcf/yr, a range that is dependent on how many times compressors are re-started in a year and how readily the engine starts up and stays running. A single start-up of a properly tuned engine may require 1 to 5 Mcf of gas at 200 psig average volume tank pressure, depending on engine size (horsepower). Blowdown valves of a size and pressure differential similar to the gas shut-off valve leak up to 150 cfh or 1.3 MMcf/yr.

Economic Analysis

Basis for Costs and Savings

Methane emission savings of 1,350 Mcf/yr apply to one engine starter, ten start-ups per year and methane leakage through the gas shut-off valve.

Discussion

This technology can provide a payback in less than three years. Important economic considerations include the capital cost of installing an electric starter motor, the revenue gained from salvaging the gas expansion turbine starter, and the cost of the electric power needed to drive the motor. The electrical energy required for the new starter will be equivalent to the energy imparted by the gas expansion. Using an electrical power cost of 7.5¢/kWh, the gas expansion turbine above is equivalent to $1-5 per engine start attempt, depending on engine size (horsepower).